

**Vermont Technical College's
Manufacturing Technician Apprenticeship Programs**

**GE-Aviation/GW Plastics/NH Tool/GS Precision/
GlobalFoundries**

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Vermont Technical College's Manufacturing Technician Apprenticeship Programs

GE-Aviation

- Toolmaker
- Electrical Maintenance Tech
- Mechanical Maintenance Tech
- Master's Program

Global Foundries

- Maintenance Technician

GW Plastics/NH Tool

- Manufacturing Technology Leadership

GS Precision

- Manufacturing Technician

Manufacturing Technician Apprentice Programs



- Full-time employment
- \$18-\$24 per hour/plus benefits
- 3000-6000 hours OJT
- 20-40 college credits
- Tuition, books, software paid for by company
- Matriculated Vermont Tech Student
- Bonuses/Salary Increase/Promotion upon Graduation
- Tuition Reimbursement Programs to continue education = degree

Background

- By 2018, 80% of the workforce will be required to have some formal education beyond high school

United States Department of Labor

- Among Vermont's 50 fastest growing occupations, 44 require significant postsecondary education or training

Vermont Business Roundtable

- People with associate degrees earn 40 percent more than people with only a high school diploma, and people with bachelor's degrees earn on average 80 percent more over their lifetimes

Education Policy Foundation

GSP Technician Apprenticeship Course Sequence

Class of 2019

Year One

Fall 2017 -

MAT1042 Technical Mathematics
MEC1020 Manufacturing Processes

Spring 2018 -

MEC1011 Design Communications
MEC1060 Metrology & Inspection

Year Two

Fall 2018 -

MEC1070 Tool Geometry/Metal Cutting
ENG2080 Tech. Communications

Spring 2019 -

MEC2040 Computer-Aided
Manufacturing
ELT2730 Engineering Project

GE Toolmaker Apprenticeship Course Sequence

Class of 2020

Fall 2017:

- MEC1020 Manufacturing Processes
- MEC1011 Design Communications

Spring 2018:

- **MAT1420 Technical Mathematics**
- MEC1070 Tool Geometry and Metal Cutting

Summer 2018:

- BUS2351 Business Leadership I

Fall 2018:

- ENG2080 Technical Communications
- MEC1060 Metrology & Inspection

Spring 2019:

- PHY1041 Physics I
- MEC2040 Computer-Aided Technology

Summer 2019:

- BUS2352 Business Leadership II

Fall 2019:

- MEC2020 Applied Mechanics
- MAT2021 Statistics

Spring 2020:

- MEC2070 Machine Design Components
- ELT2730 Engineering Project

GW Plastics/NH Tool Manufacturing Apprenticeship Course Sequence Class of 2021

Fall 2017:

MAT1311 Pre-Calculus I

Spring 2018

MAT1312 Pre-Calculus II

Fall 2018:

MEC1020 Manufacturing Processes

Spring 2019

MEC1060 Metrology & Inspection

Fall 2019

MEC1011 Design Communications

Spring 2020

MEC2040 Computer-Aided
Technology

Fall 2020

ENG2080 Technical
Communications

Spring 2021

ELT2730 Engineering Project

GlobalFoundries Maintenance Technician Apprenticeship Course Sequence

Fall 2019

MAT1311 Pre-Calculus I

Spring 2020

PHY1041 Physics I

Summer 2020

ELT1031 Circuits I

Fall 2020

MAT1312 Pre-Calculus II

Spring 2021

ELT1032 Circuits II

Summer 2021

ELT2075 Advanced PLC's

Fall 2021

ELT1110 Digital Circuits

Spring 2022

ELT3070 Semiconductor
Technology

Summer 2022

ELT2130 Industrial
Electronics

Fall 2022

ELT2730 Engineering Project

Education/Career Pathway

Manufacturing Apprenticeship Program

Leading to,

**Vermont Tech's Associate in Applied Science Degree
in Engineering Technology**

Leading to,

**Vermont's Tech's Bachelor of Science Degree in
Business or Manufacturing Engineering.**



GlobalFoundries/VTC Technician Apprenticeship Program

July 18th, 2019



Maintenance Mechanic & Technician Pipeline Overview

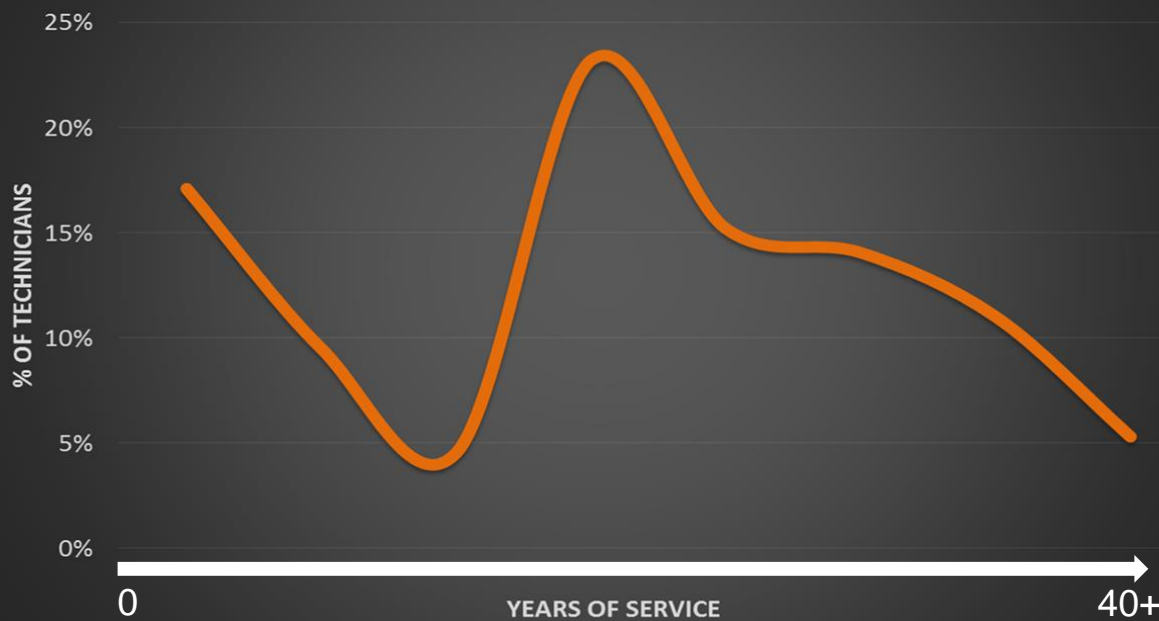
- Problem: Tenured mechanic and technician workforce with ~80-100 employees eligible for retirement
 - Risk of not transferring knowledge & experience
 - Fabricator operational performance risk
- Position Descriptions:
 - Mechanic: performs preventative & first call maintenance and can not work on energized equipment.
 - Technician: can perform mechanic duties and can work on energized equipment.
- 2018 Market not Yielding Technician Candidates
 - Unemployment Rate < 2% (VT = 1.9% → Chittenden County 1.6%)
 - Technical College/University Recruiting / Job Fairs not yielding candidates
 - Starting Pay Rate not Competitive
 - Attrition Rates = 2-3 Technicians per month
 - Candidates Pools are cyclical in the industry
- 2019 Addressing Multiple Pipeline Approaches
 - Internal Growth Path for Operators → Mechanics → Technicians (Tuition Refund Program)
 - **Starting Pay Increase for Mechanics (up to \$21.50/hr) and Technicians (up to \$26.00/hr)**
 - External Professionals → Local/National
 - Technical College & Universities → Campus presence and recruiting & job/career fairs
- Need: Partnering with VTC, create an additional technician pipeline through a technician apprenticeship program



GlobalFoundries Technician Demographics

Fab 9 Demographics

Fab 9 Equipment Technician % of Population by Years of Service



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Technician Program Summary



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VERMONT
TECH

Successful Candidate Attributes & Inputs:

- Tech Center/High School 2019 Graduates
- Must be 18 years or older to apply
- Must Submit Resume with Application
- Acceptable GPA → 2.7 (B- or higher)
- Dependable
- Demonstrated Technical Aptitude
- Pass interview process to be selected for pre-testing
- Pass Math (Algebra) pre-testing with VTC
- Max Class size of 16 Students

Curriculum and Cadence

- VTC Course to be held at it's Williston Campus
 - 1 Course per Semester → 3 Semesters per Year
- Internal Courses to be held on GlobalFoundries Campus

VTC Curriculum (34 Credits towards ~67 Credits for AS Degree EET)			
Year	Spring	Summer	Fall
Year 1		Pre-Testing	MAT 1311 Pre Calculus 1 (3 Credits)
Year 2	PHY 1041 Physics 1 (4 Credits)	ELT 1110 Digital Circuits (3 Credits)	MAT 1312 Pre Calculus 2 (3 Credits)
Year 3	ELT 1031 Circuits 1 (4 Credits)	ELT 2075 Programming Logic Controllers (3 Credits)	ELT 1032 CIRCUTS 2 (4 Credits)
Year 4	ELT 3070 Semiconductor Technology (3 Credits)	ELT 2130 Industrial Electronics (4 Credits)	Capstone Project (GF Work Project) (2 Credits)

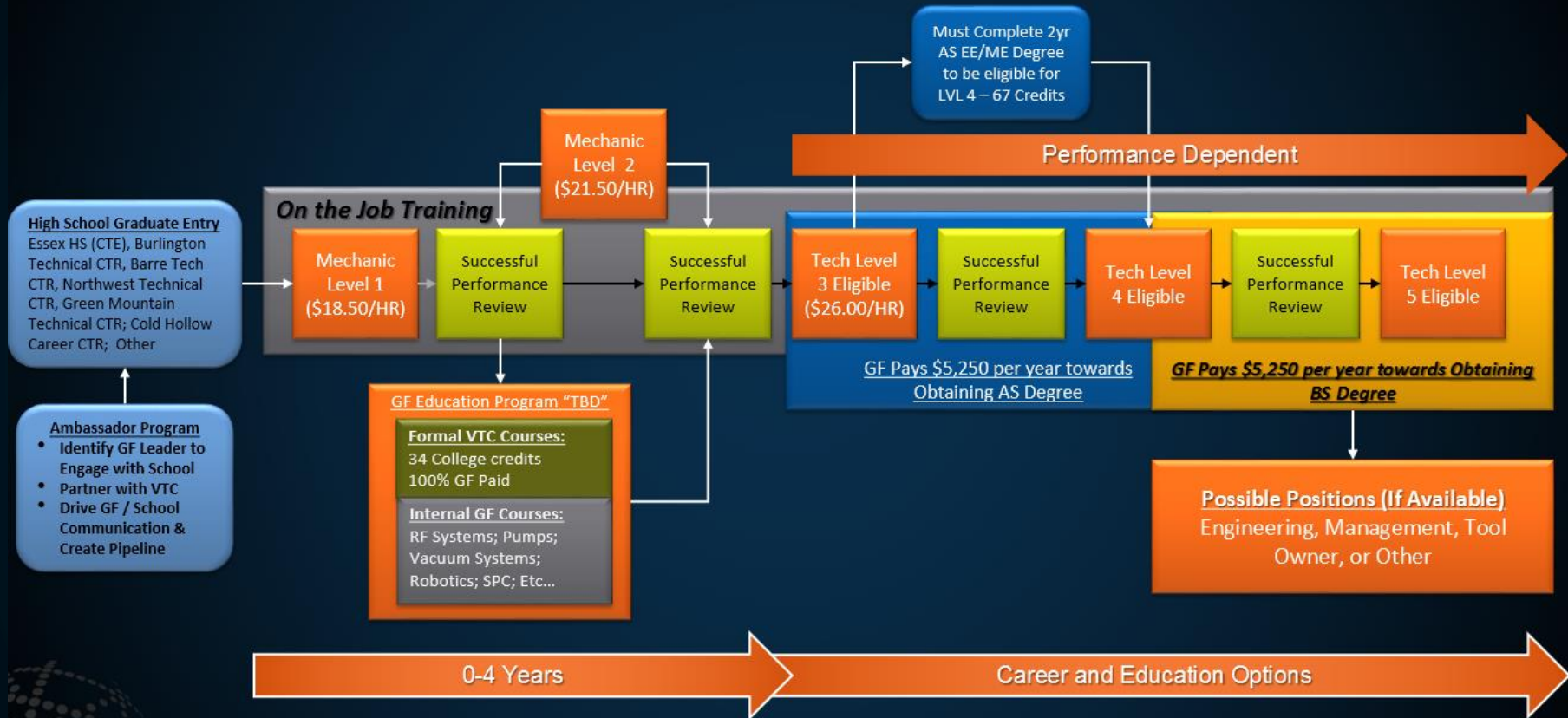
GF Courses / Certifications			
Year	Spring	Summer	Fall
Year 1		Safety Training, Certification, & Operating Equipment Platform they will be assigned to	Lean MFG 1) Lean 101: 8 Hours (Internal) 2) Lean 5S: 8 Hours (Internal)
Year 2	Lean MFG 1) JBIs: 2 Days (Internal) 2) 4Ps: 2 Days (Internal)	Lean MFG 1) Structured Problem Solving: 2 Days (Internal) 2) Book Club: 15 Hours (Internal)	Parts Ordering & Fab Level Metrics: 1) Parts Ordering/Returns 2) Spending 3) Availability
Year 3	General Maintenance Practices 1) Soldering: NASA Type, Splicing Wires, Heat Shrinking, etc... 2) Plumbing: Swagelok fittings, Flaretek fittings, Pilar fittings, bending stainless lines, Heat forming Teflon lines, etc...	General Maintenance Practices 1) Schematics: Electrical and Pneumatic etc 2) Test Equipment: Meters, Scopes, Amp Meters etc...	Technical Communications (Google) 1) Google Tools (Drive, Slides, Groups, Sites, etc) 2) Technical Communications/Presentations
Year 4	Vacuum Systems & Leak Checking 1) Vacuum System Principles 2) Components of Systems 3) Troubleshooting / Leak Checking	Preventive Maintenance 1) Documentation (Perfect PM) 2) Performing the work 3) Continuous Improvement	Select One: 1) RF Systems (Introduction) 2) Robotics/Handling Systems 3) TBD



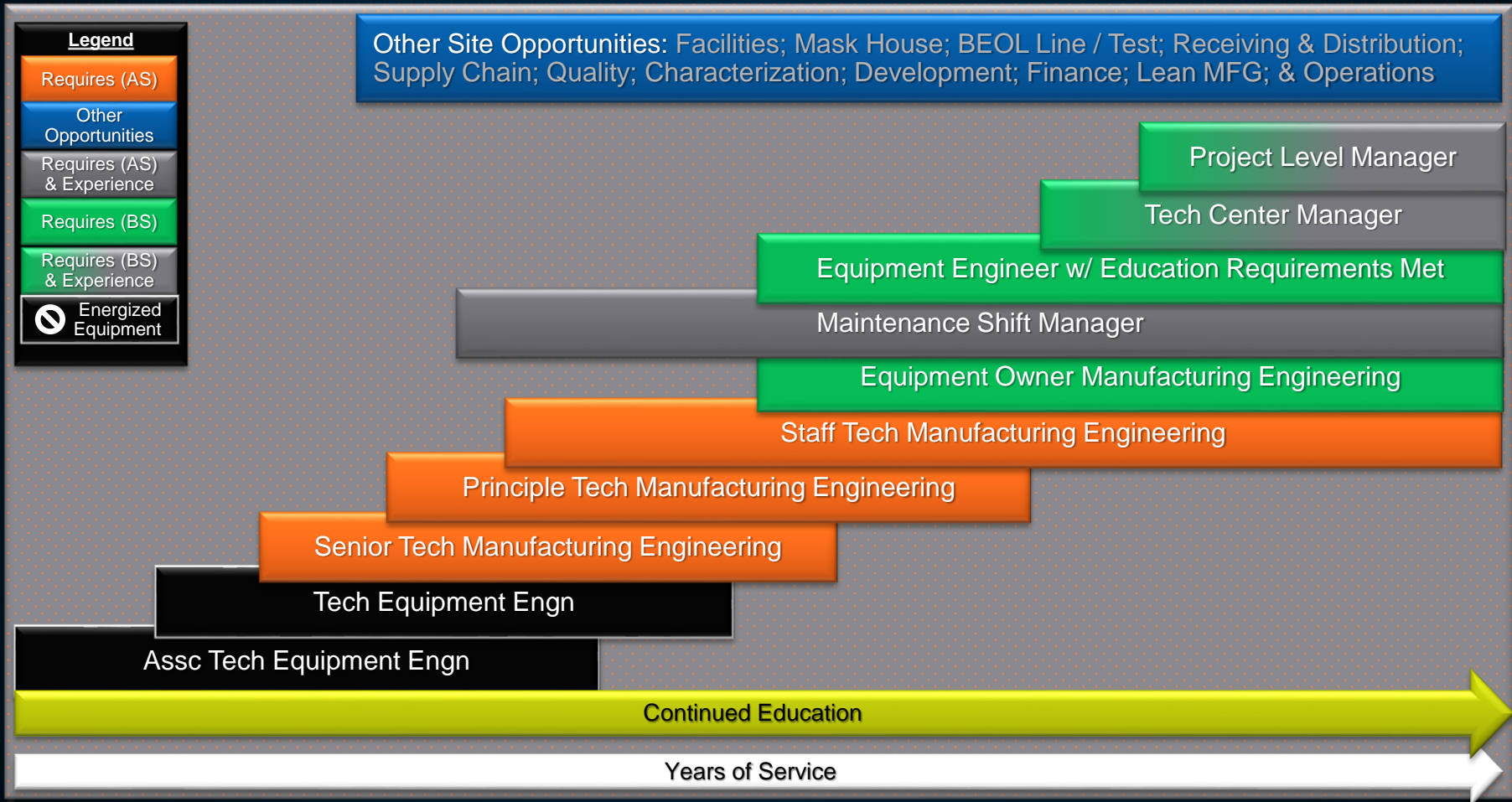
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GF Technician Apprenticeship Program Career Path

GF Fab 9 Technician Program Pipeline – Flow Chart



Opportunities → Technician Career Ladder (example)



2019 Fall Technician Program Status

- Candidates
 - 9 Internal candidates accepted into program
 - 5 External candidates accepted into program
 - 2 External candidates in testing phase (07/31)
- Schedule
 - Classes start on 08/26/19
- Observations
 - External candidate pool did not populate as expected
 - Internal candidate pool healthy
- 2020 Actions
 - Develop external candidate recruiting plan with local HS/TCTRs/State
 - Testing preparation → Algebra Refresher courses/on-line
 - Achieve apprenticeship status for grant opportunity



Thank You!!

Questions??



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